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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,421	11/02/2001	Joseph M. Milewski	END919970013US2	4204

7590

09/10/2003

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EXAMINER

VU, HUNG K

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/001,421

Applicant(s)

MILEWSKI ET AL.

Examiner

Hung K. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-19 is/are pending in the application.
- 4a) Of the above claim(s) 15-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 19 June 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities: In claim 11, line 2, “;” should be changed to “:”, for clarity. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoebener et al. (PN 5,492,266, of record).

Hoebener et al. discloses, as shown in Figures 4, 5 and 12, an interconnect structure for a semiconductor chip comprising,

a Pb-rich ball (12) attached to the semiconductor chip (9) and having an exposed surface; the ball being an assembly having a weight composition of about 97/3 Pb/Sn, which has a relatively high melting point.

Note that the terms “nonreflowed”, “... a thin layer of Sn deposited on the exposed surface of the Pb-rich ball, wherein Sn from the thin layer and Pb from the ball are diffused and intermixed to form an assembly ...” and “... at least a portion of said Pb-rich ball having at least one thin coating of a low melting point metal ... said low melting point metal and Pb from said ball are diffused and intermixed after reflowing and annealing to form an assembly” are method

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recitations in a device claimed. Note that only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not. Also note that claims 1-14 recited the product-by-process step to form the structure, therefore, at the final structure, there is only the assembly having a weight composition as claimed with no thin layer of Sn or a low melting point metal. The thickness of the thin layer of Sn or the low melting point metal, as recited in claims 12 and 14, does not exist at the final structure. Instead, at the final structure, there is only the assembly with weight composition of about 97/3 Pb/Sn.

3. Claims 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Crafts et al. (PN 5,492,235, of record).

Crafts et al. discloses, as shown in Figure 8, an interconnect structure for a semiconductor chip comprising,

a Pb-rich ball (19) attached to the semiconductor chip (10) and having an exposed surface;

the ball being an assembly having a weight composition of about 97/3 Pb/Sn, which has a relatively high melting point.

Note that the terms "nonreflowed", "... a thin layer of Sn deposited on the exposed surface of the Pb-rich ball, wherein Sn from the thin layer and Pb from the ball are diffused and intermixed to form an assembly ..." and "... at least a portion of said Pb-rich ball having at least one thin coating of a low melting point metal ... said low melting point metal and Pb from said ball are

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diffused and intermixed after reflowing and annealing to form an assembly” are method recitations in a device claimed. Note that only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not. Also note that claims 1-14 recited the product-by-process step to form the structure, therefore, at the final structure, there is only the assembly having a weight composition as claimed with no thin layer of Sn or a low melting point metal. The thickness of the thin layer of Sn or the low melting point metal, as recited in claims 12 and 14, does not exist at the final structure. Instead, at the final structure, there is only the assembly with weight composition of about 97/3 Pb/Sn.

Response to Arguments

4. Applicant's arguments filed 06/19/03 have been fully considered but they are not persuasive.

It is argued, at page 5 of the Remarks, that Hoebener and Crafts do not disclose all of the claimed limitations of claims 11 and 13 since these claims define the interconnect structure as being the structural requirements not process requirements. This argument is not convincing because claims 11 and 13 still define process recitations in a device claimed (i.e., nonreflowed solder, diffused and intermixed after reflowing and annealing to form). Since these claims are about the product so that only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in

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“product by process” claims or not. Note that, at the final structure, there is only the assembly with weight composition of about 97/3 Pb/Sn.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

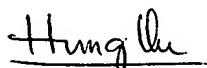
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

August 30, 2003

A handwritten signature in cursive script, appearing to read "Hung Vu", written over a horizontal line.

Hung Vu

Patent Examiner